

CLAIMS

1. A target detection system comprising:
  - a radar;
  - an image acquisition unit; and
  - 5 a processing unit for specifying an area of image recognition based on the data output from said radar and processing the image data output from said image acquisition unit only for said specified area.
- 10 2. A target detection system comprising:
  - a radar for scanning a specified area and outputting signal of power corresponding to an object scanned;
  - 15 an image acquisition unit for acquiring an image of said specified area; and
  - 20 a processing unit for specifying an area of image recognition based on the power of the signal output from said radar, extracting the edge data from the image data output from said image acquisition unit only for said specified area, and detecting a target based on said edge data.
- 25 3. A target detection system according to claim 2, wherein said processing unit specifies an area having said power not less than a predetermined level as said image recognition area.
- 30 4. A target detection system according to claim 2, wherein said processing unit specifies an area having said power between a first predetermined level and a second predetermined level as said image recognition area.
- 35 5. A target detection system according to claim 2, wherein, in the case where the level of said power has a plurality of peaks, said processing unit specifies an area constituting a valley between the peaks as said image recognition area.
6. A target detection system according to claim 2, wherein said processing specifies as said image recognition area an area having said power not less

than a predetermined level, an area having said power between a first predetermined level and a second predetermined level, and an area constituting a valley between peaks in the case where the level of said power has a plurality of peaks.

5           7. A target detection system according to claim 2,  
              wherein said processing unit extracts the  
              peak position of the power of the signal output from said  
              radar, checks the density change, on the left and right  
10          sides of said peak position, of the image data output  
              from said image acquisition unit, extracts the position  
              where the density change ceases to be laterally  
              symmetric, and specifies an area having a predetermined  
              width about said extraction position as said image  
15          recognition area.

10          8. A target detection system according to claim 2,  
              wherein said processing unit extracts the  
              peak position of the power of the signal output from said  
              radar, examines the density projection value, on the left  
              and right sides of said peak position, of the image data  
              output from said image acquisition unit, extracts the  
              position where the density projection value ceases to be  
              laterally symmetric, and specifies an area having a  
              predetermined width about said extraction position as  
20          said image recognition area.  
25          

20          9. A target detection system comprising:  
              a radar for scanning a specified area and  
              outputting signal of power corresponding to an object  
              scanned;  
30          an image acquisition unit for acquiring an  
              image of said specified area; and  
              a processing unit for extracting the edge  
              data from the image data output from said image  
              acquisition unit, specifying an area of image recognition  
              based on the power of the signal output from said radar,  
              and detecting a target using those of said extracted edge  
35          data existing in said specified area.

10. A target detection system according to claim 9,  
wherein said processing unit specifies an  
area having said power not less than a predetermined  
level as said image recognition area.
- 5 11. A target detection system according to claim 9,  
wherein said processing unit specifies an  
area having said power between a first predetermined  
level and a second predetermined level as said image  
recognition area.
- 10 12. A target detection system according to claim 9,  
wherein, in the case where the level of  
said power has a plurality of peaks, said processing unit  
specifies an area constituting a valley between the peaks  
as said image recognition area.
- 15 13. A target detection system according to claim 9,  
wherein said processing unit specifies, as  
said image recognition area an area having said power not  
less than a predetermined level, an area having said  
power between a first predetermined level and a second  
predetermined level, and an area constituting a valley  
between peaks in the case where the level of said power  
has a plurality of the peaks.
- 20 14. A target detection system comprising:  
a radar for outputting a near flag in the  
state corresponding to the distance upon determination  
that a target exists in a near area;
- 25 an image acquisition unit for acquiring  
the image of a specified area; and
- 30 an image recognition unit for outputting  
edge data by processing the image data output from said  
image acquisition unit;
- 35 a processing unit for determining the  
state of the near flag output from said radar and  
detecting a target based on the edge data in the distance  
range corresponding to the state of said near flag among  
the edge data output from said image recognition unit.
15. A target detection system comprising:

a radar for outputting a near flag in the state corresponding to the distance upon determination that a target exists in a near area;

5           an image acquisition unit for acquiring the image of a specified area;

10          an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, removing and outputting the edge data in the distance range corresponding to the state of the near flag output from a processing unit; and

15          a processing unit for determining the state of the near flag output from said radar, outputting the result thereof to said image recognition unit, and detecting a target based on the edge data output from said image recognition unit.

16. A target detection system comprising:

20          a radar for outputting a near flag in the state corresponding to the distance upon determination that a target exists in a near area;

25          an image acquisition unit for acquiring the image of a specified area;

30          an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, performing the pattern matching processing in priority for the edge data within the distance range corresponding to the state of the near flag output from a processing unit, and outputting said edge data; and

35          a processing unit for determining the state of the near flag output from said radar, outputting the result thereof to said image recognition unit, and detecting a target based on the edge data output from said image recognition unit.

36. A target detection system comprising:

37          a radar for outputting a near flag in the state corresponding to the distance upon determination

that a target exists in a near area;  
an image acquisition unit for acquiring  
the image of a specified area;  
an image recognition unit for acquiring  
5 edge data by processing the image data output from said  
image acquisition unit and, among said edge data,  
outputting by attaching the road surface flag to the edge  
data identified as an edge of the road surface from the  
height information and the distance information obtained  
10 from said image data; and  
a processing unit for determining the  
distance range corresponding to the state of the near  
flag output from said radar, invalidating the edge data  
output from said image recognition unit and having said  
15 road surface flag attached thereto, in the case where the  
distance information of said edge data with said road  
surface flag attached thereto indicates a near distance  
and said determined distance range indicates a far  
distance, and performing said target detection process  
20 based on the remaining edge data.

18. A target detection system comprising:  
a radar for outputting distance  
information;  
an image acquisition unit for acquiring  
25 the image of a specified area;  
an image recognition unit for acquiring  
edge data by processing the image data output from said  
image acquisition unit and, among said edge data,  
outputting by attaching the road surface flag to the edge  
30 data identified as an edge of the road surface based on  
the height information and the distance information  
obtained from said image data; and  
a processing unit for determining whether  
the distance information of the edge data output from  
35 said image recognition unit and having said road surface  
flag attached thereto is within the allowable error range  
of the distance information acquired from said radar, in

the case where said edge data with said road surface flag attached thereto indicates a far distance, and invalidates said edge data and performs the target detection process based on the remaining edge data in the case where said distance information is not within said allowable error range.

- 5           19. A target detection system comprising:
- 10            a radar for outputting a near flag in the state corresponding to the distance upon determination that a target exists in a near area;
- 15            an image acquisition unit for acquiring the image of a specified area;
- 20            an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, outputting by attaching a letter flag to the edge data identified as a letter on the road surface based on the density information obtained from said image data; and
- 25            a processing unit for determining the distance range corresponding to the state of the near flag output from said radar, invalidating the edge data output from said image recognition unit and having said letter flag attached thereto in the case where the distance information of the edge data with said letter flag attached thereto indicates a near distance and said determined distance range indicates a far distance, and performing said target detection process based on the remaining edge data.

- 30           20. A target detection system comprising:
- a radar for outputting distance information;
- an image acquisition unit for acquiring the image of a specified area;
- 35            an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, outputting by attaching a letter flag to the edge data

identified as a letter on the road surface based on the density information obtained from said image data; and  
a processing unit for determining whether  
the distance information of the edge data output from  
said image recognition unit and having said letter flag  
attached thereto is within the allowable error range of  
the distance information acquired from said radar, in the  
case where said distance information of the edge data  
with said letter flag attached thereto indicates a far  
distance, and invalidating said edge data and performing  
the target detection process based on the remaining edge  
data in the case where said distance information is not  
within said allowable range.

21. A target detection system comprising:

a radar for outputting a near flag in the state corresponding to the distance upon determination that a target exists in a near area;

an image acquisition unit for acquiring the image of a specified area;

an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, outputting by attaching a road surface flag to the edge data identified as a letter on the road surface based on the height information and the distance information obtained from said image data, and also by attaching a letter flag to the edge data identified as a letter on the road surface based on the density information; and

a processing unit for determining the distance range corresponding to the state of the near flag output from said radar, and invalidating the edge data output from said image recognition unit and having at least one of said road surface flag and said letter flag attached thereto, in the case where the distance information of said edge data having at least one of said road surface flag and said letter flag attached thereto indicates a near distance and said determined distance

range indicates a far distance, and performing said target detection process based on the remaining edge data.

22. A target detection system comprising:

- 5                   a radar for outputting a near flag in the state corresponding to the distance upon determination that a target exists in a near area;
- 10                  an image acquisition unit for acquiring the image of a specified area;
- 15                  an image recognition unit for acquiring edge data by processing the image data output from said image acquisition unit and, among said edge data, outputting by attaching a road surface flag to the edge data identified as a letter on the road surface based on the height information and the distance information obtained from said image data and also by attaching a letter flag to the edge data identified as a letter on the road surface based on the density information; and
- 20                  a processing unit for determining whether the distance information of the edge data output from said image recognition unit and having at least one of said road surface flag and said letter flag attached thereto is within the allowable error range of the distance data obtained from said radar, in the case where the distance information of said edge data having at least one of said road surface flag and said letter flag attached thereto indicates a far distance, and
- 25                  invalidating said edge data having at least one of said road surface flag and said letter flag attached thereto and performing said target detection process based on the remaining edge data, in the case where said distance information is not within said allowable error range.
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